

**Testimony before the House Commerce Committee
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**Michael Garfield
Ecology Center**

I am Michael Garfield, Director of the Ecology Center, a nonprofit environmental organization. My comments are the partial product of discussions among several state and national organizations – including the National Wildlife Federation, Clean Water Action, Michigan Environmental Council, West Michigan Environmental Action Council, Michigan League of Conservation Voters, and PIRGIM.

We support the concept behind the bond proposal, that Michigan should make strategic investments to convert its economy to the knowledge-based industries of the future. Among those industries of the future are those that produce environmental technologies, and I would suggest that these industries are already producing the jobs of today.

According to a study released last year by Management Information Services Inc., a DC-based economic research firm, Michigan already employs 200,000 people in jobs linked to the environment. And the potential exists for increasing that number dramatically.

Perhaps the most widely publicized of the current-day environmental technologies are hybrid electric vehicles. We read reports about hybrid sales skyrocketing far faster than U.S. auto observers predicted just a few short years ago. While industry analysts now project hybrids winning ten percent market share by the end of the decade, the domestic automakers admit to being several years behind the Japanese in development of their own hybrid drive trains. And when Toyota chooses a location for production of their new hybrid Camry, they select Kentucky.

Let's not let that happen again. Michigan should host the jobs of the future – especially when those jobs are making the cars and trucks of the future.

But environmental technologies are about more than vehicles. They're about producing energy, about manufacturing consumer and industrial products, and about providing water resources in a sustainable way. The rest of the country – and the rest of the world – is moving quickly to transform their industries and products to support a sustainable economy. Michigan should get out in front of this trend.

We are pleased that the bond proposal includes funding for “advanced automotive, manufacturing, and materials” and for “alternative energies.” Both of these areas are high-growth fields with significant job-creation potential. Both areas are fields where Michigan starts with a competitive advantage over other states, and the proposed public investment is vital to maintaining our edge.

There are, however, important high-growth areas within these categories that have been neglected so far in the drafting of the bond language. I would encourage you to broaden the definition of "advanced materials" to include the highly promising field of Green Chemistry, which includes bio-based materials, plant-based plastics, bio-fuels, and bio-plastics, and which could lead to more environmentally friendly plastics and pesticides, and new uses for wood products and farm crops. In the "alternative energies" category, I would encourage you to broaden the definition to include energy efficiency research and technology.

I will speak in some detail about green chemistry, and James Clift of the Michigan Environmental Council will testify about energy efficiency.

1. Advanced Materials – Green Chemistry

Within the broad area of "advanced materials," the emerging research field of Green Chemistry holds the potential for fast commercialization of technologies, the advent of new jobs, and the hope of a cleaner environment.

What is green chemistry?

It is the science of producing bio-based or plant-based materials, chemicals, and catalysts that reduce or eliminate the use or generation of hazardous substances through safe and efficient processes. It includes the production of bio-fuels, such as ethanol and bio-diesel, which are already earmarked in the bond proposal through the NextEnergy authorization. But it also includes the production of plastics, surfactants, solvents, polymers, and acids, none of which are covered by the bond proposal.

What is its potential?

According to a 2002 study conducted for the U.S. Department of Energy and the USDA (*Roadmap for Biomass Technologies in the United States*; Biomass Research and Development Technical Advisory Committee), bio-based materials are estimated to grow from .5% of current production to more than 12% by 2010, and 25% by 2030. Research in the field is underway at Michigan Tech, Michigan State University, and the University of Michigan. The presence of the world's largest chemical and pharmaceutical companies in Michigan (both of whom have invested in bio-based chemical research), along with the state's strong agricultural base, make the state a likely site to encourage R&D and commercialization of technologies.

Right now, Michigan businesses are testing, using, and producing bio-based materials. For example, Interface Fabrics Group, in Kentwood, is using PLA (polylactic acid, or corn-based) fabrics. Herman Miller, in Zeeland, is also using PLA fabrics, as well as bio-based particle board and bio-adhesives. KTM Industries, in Lansing, is using PLA packaging material.

According to one federal report (*Fostering the Bioeconomic Revolution in Biobased*

Products and Bioenergy: An Interagency Strategic Plan Prepared in Response to Executive Order 13134; by the Biomass Research and Development Board, January 2001), “two of the most important classes of bio-based products are plastics and surfactants. More than 80 billion pounds of plastics are produced by the chemical industry annually, the great majority of which are derived from fossil fuels. Innovations in developing these plastics with unique properties and high performance could open up huge markets. The bio-based plastics market could reach 3 billion pounds or more by 2010.” The report adds that 35% of all surfactants – used primarily in detergents, cleansing products and in medications – are already derived from bio-based resources, and that this sector is expected to grow.

In Michigan, there is a potentially enormous market for bio-plastics in the auto and furniture industries.

In addition, the sugars derived from crops and grasses can be substituted for the function of petrochemicals to make hundreds of products including alcohols such as ethanol, glycols and sorbitol with uses from fuel to antifreeze, from brake fluids to solvents; acids, such as lactic acids, are used in an array of applications from making cheese and preparing soft drinks to producing the building blocks for bio-based plastics; polymers such as xanthum gum is used to thicken food, but also as a gel in toothpaste, medicines and paints.

What is the competitive environment?

While the field is promising, public and private investment is only beginning, so Michigan has an opportunity to attract industry leaders. New England universities have already created a regional Green Chemistry Consortium, and are receiving \$500,000 in federal funding for its efforts. Legislation is pending in Congress (H.R. 3970, introduced by Rep. Phil Gingrey, R-GA, and endorsed by the American Chemical Society and leading chemical manufacturers) to promote federal green chemistry research and development through a working group that includes the National Science Foundation and the U.S. Environmental Protection Agency. To make Michigan a leader in the rapidly growing field of advanced materials, Michigan could:

- fund centers where promising green chemistry ideas can be scaled up and demonstrated as commercially viable, in order to reduce risk for businesses (using old brownfield sites would encourage further jobs creation in key areas); and,
- provide direct technical assistance to businesses wanting to adopt these technologies or processes.

These last ideas, of course, are examples of the sorts of businesses that could be spurred by funding R&D and commercialization of green chemistry, and it would be up to Michigan researchers and entrepreneurs to bring forth solid proposals. I’d suggest, though, that allowing some of the bond proceeds to encourage these enterprises would be a major step for Michigan’s economy and its environment.